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NOTE ON THE PRESERVATION OF ENCEPHALA BY THE ZINC CHLORIDE. By Professor Rolleston, F.R.S.

It has long been known that Zinc Chloride may be used in conjunction with spirit for the preservation of Encephala. Gratiolet in a note at p. 11 of his famous "Mémoire sur les plis cérébraux de l'Homme et des Primatès," 1854, informs us that a certain Parisian modeller, by name Stahl, was in the habit of hardening brains for modelling, by placing them whilst fresh, and with the membranes adherent, for two or three days in a solution of Zinc Chloride marking 25° on the arèometer of Gay-Lussac. Gratiolet, however, does not say that he himself treated brains in this fashion for his own purpose; if he had so treated them he would have discovered that for purposes of manipulation it is necessary to subject the brain thus acted upon to an immersion in alcohol. This Professor von Bischoff of Munich pointed out in his Memoir on "Die Grosshirnwindungen des Menschen, *Abhandlungen der k. bayer. Akad. der. Wiss.* ii. Cl. x. Bd. ii. Abtheil. 1868, p. 401, or S. A. p. 11, 12," stating at the same time that having employed the solution of Zinc Chloride for 24 years for the preservation of subjects for dissection he had observed that the brains of subjects thus injected, and brains simply put into this solution, presented the following advantages for purposes of study. They become more plastic and tough, less liable to chapping and breaking away in flakes, than brains simply treated with alcohol; but they do require some subsequent supplementary immersion in alcohol of moderate strength to prevent the acid chloride which at first coagulates from softening the albuminous substances of the organ. A second, and this not an inconsiderable advantage, is attained by their allowing the pia mater to be stripped away with much greater ease and rapidity than is the case in brains not thus treated. Especially is this the case in the brains of fœtuses in which, whilst the substance of the convolutions is softer, the amount of their vascular supply is relatively much greater than in adults.

I have little to add to these recommendations except in the way of confirmation based upon the results attained by applying this method to specimens to be preserved permanently in catalogued series. And I may say that a permanent specimen of a brain of any vertebrate animal which has been treated with Zinc Chloride, either injected by the umbilical vessels, as is to be done in the cases of fœtuses, or otherwise brought into relation with it, contrasts very usually with a brain which has been treated with alcohol alone, in having a much smoother and less grumous surface than brains treated in this latter fashion, however painstakingly their membranes may have been picked away from them. The difference may be illustrated by saying, that the surfaces of two sets of brains, thus severally treated, differ very much in the same way that the surfaces of the bones of wild and domesticated representatives of the same species differ.

But, secondly, I would say that the condition of freshness is by no means absolutely necessary for the purposes of making anatomical preparations of brains as M. Stahl appears to have found it to be for the purpose of modelling. Having to deal with the brain of a large Toper shark, *Galeus canis*, some way removed from that condition of freshness which would have rendered it safe to attempt to remove it from the skull, I treated it for some days *in situ*, firstly, with zinc chloride, and subsequently with spirit. After this, it bore removal from the skull as well as the brains of its congeners which came into our hands in more favourable conditions, and in this matter of smoothness and clearness, and what the Germans call the "Glanz" of its surface, it compares to considerable advantage with them (See Prop. 896, *b. c.* Anatomical Department, Oxford University Museum). For the successful application, however, of Broca's method of hardening and shrinking a brain by nitric acid, for which see *Mem. Soc. Anthrop.*, Paris, ii. 1865, p. 84, into a mass which, when dried and varnished, bears handling for an indefinite period; I take this opportunity of saying that I incline to think the condition of freshness is usually necessary. Brains, however, like other organs, vary very much in their consistence and power of taking on consistence after death, and the amount of uncertainty which attaches to this latter mode of preserving brains may perhaps be explained otherwise. Thirdly, I have observed in adult human brains, treated with Burnett's solution of zinc chloride, that the larger arteries will, if not removed sufficiently early, recoil or retract themselves as arteries in a living body will do when cut away from their peripheral ramifications, and so come to imbed themselves in the substance of the convolutions, and thereby channel and disfigure them. In this matter of the expediency of not delaying the removal of the membranes, the nitric acid method coincides with the zinc chloride. (For this, as regards the former method, see Dr Bevan Lewis, cit. Dr J. Crichton Browne, on General Paralysis of the Insane, *West Riding Lunatic Asylum Medical Reports*, vol. vi. 1876, p. 203.)

In conclusion, I may draw attention to the fact that Duvernoy in his Memoir on the Nervous System of the Lamellibranchiata published with exquisite and accurate illustrations in the *Mémoires de l'Institut*, 1854, p. 8, tells us that he used zinc chloride for his dissections.

The specific gravity of Burnett's solution of zinc chloride is about 1·343, and may be used undiluted for the purposes in question. The above method of preserving the brain, which we have for some years carried out in the Oxford Museum, agrees in its essential features with the first stage of the process recently described by Dr Carlo Giacomini in a communication made to the Royal Academy of Medicine of Turin. (See Abstract in Report on recent memoirs on the Anatomy of the Brain in this number of the *Journal.*)